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ABSTRACT

Ninety-three third and 78 fifth grade students participated in this study of the effectiveness of four methods of teaching word meanings: association method, category method, context method, and dictionary practice. Students were taught twelve words a week for eight weeks, with the performance score on weekly evaluation tasks as the dependent variable. Results indicated that the context method was the most effective at both grade levels. Findings were interpreted as supporting vocabulary instruction which includes using new words in sentences that provide examples of appropriate usage and associating new words with familiar synonyms. Instruction relying on category labels or dictionary practice was not supported. (AA)

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Investigating Techniques for Teaching Word Meanings

Instruction in the teaching of word meanings becomes most important at the third grade level when children begin experiencing specific vocabulary related to the content areas. Current practices in teaching word meanings, techniques such as dictionary practice, matching synonyms and antonyms, study of word origins and word parts, and the use of context (Petty, Herold, & Stoll, 1968) have no established theoretical basis. In addition, research in the area of vocabulary development has not dealt with the theoretical bases for the methods used (Gipe, 1977, p. 5).

The purpose of this study was to examine the effectiveness of four methods of teaching word meanings in order to determine which might be the most effective. An attempt was made to review the influences of language, cognitive development, and memory processes on the learning of word meanings in elementary school children. The influence that level of reading achievement (good and poor readers) may have on the performance of the subjects on experimental tasks was examined. Also, the influence that the sex of the subject may have on the subject's performance on experimental tasks was examined. In addition, the overall improvement in correct responses for the words taught in this study was examined.

Learning the meaning of a word may be viewed as an association task whereby an unknown word's meaning can become known by being presented in

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connection with a known word of similar meaning. This viewpoint is representative of a cognitive theory for an associative memory structure (Brown, 1958; Rumelhart, Lindsay, & Norman, 1972; Simon & Feigenbaum, 1964; Wickelgren, 1972), and is supported by Mandler and Dean (1969) and Thomson and Tulving (1970) who demonstrate that items presented together are most likely to be recalled together.

Learning word meanings can also be viewed as hierarchically organized categorical or labeling tasks whereby a new word's meaning can become known by including it in a category with other known words which represent the concept of the new word's meaning. This viewpoint is representative of a cognitive theory for a hierarchical memory structure (Collins & Quillian, 1969, 1970). Bower et al. (1969) provide evidence that hierarchically organized information improves storage and retention of information. Results of a study by Smith, Shoben, and Rips (1974) support a featural model for semantic decisions which assumes hierarchical organization of semantic features.

Another way of viewing the learning of word meanings is to treat each new word as a concept and proceed to teach the word as a concept. This would include defining the word, providing examples and instances in which the word is used appropriately, and providing for application of the word's meaning. This viewpoint is representative of a cognitive theory for an interactive long-term memory structure (Lindsay & Norman, 1972; Rumelhart, Lindsay, & Norman, 1972; Sticht et al., 1974) and of concept formation

(Ausubel, 1963; Kintsch, 1974; Lindsay & Norman, 1972). In addition, Wittrock et al. (1975) demonstrate that a familiar context facilitates vocabulary development and retention. Support for providing students with an opportunity to apply a new word's meaning is evidenced by the results of a study by Hare (1975).

In the present study, the investigator attempted to provide an example for approaching vocabulary development from a theoretical basis, and tried to strengthen some weaknesses in the present knowledge of how word meanings are learned, through the utilization of a controlled presentation and examination of the results of several methods of instruction in vocabulary. The techniques and procedures utilized represent a potential contribution of the research presented in this paper. The effects of time and word difficulty that could easily occur in a study dealing with teaching word meanings over a period of time are dealt with, and procedures for eliminating such effects are suggested. The technique of counterbalancing in a Latin square type design, and the use of repeated measures so that each subject serves as his own control, may provide design direction for those interested in comparing methods or new techniques for teaching reading skills.

This study was an attempt to develop techniques for teaching word meanings which represent a theoretically sound approach. The three techniques devised were called: association method, category method, and context method. The association method (A) paired the unknown, or target,

word with a familiar synonym or brief definition. The task required that the subjects memorize the pairings in order to be able to rewrite the original pairs without referring back to the study sheet.

The category method (B) required that the subjects add to a list of words fitting a general category. Each list provided for the subject contained one target word and three familiar words. The subjects were asked to study the lists, add words from their own background to each list, and then to recategorize a random listing of all the previously provided words without referring to the study lists.

The context method (C) utilized the target words in meaningful sentences. This method required that the subjects read a three sentence passage where each sentence used the target word in a defining context. The context of the sentences were of a simple sentence structure and contained common words to make the context familiar. Each subject was asked to respond in writing to a question at the end of the passage with a word or phrase from his personal background experiences that further exemplified the target word.

A fourth method was used, a dictionary method (D), so that some conclusions regarding its effectiveness could be made since use of the dictionary is a common approach for learning new words (Petty, Herold, & Stoll, 1968). The dictionary method instructed the subjects to look up the target words in the dictionary, write their definitions, and write sentences containing each new word.

Specifically, the purpose of the study was to compare the effectiveness of the four methods, association, category, context and dictionary, in order to determine the most effective components for teaching word meanings. It was hypothesized that the vocabulary retained would be different for the four methods, with the greatest increase in vocabulary occurring with the context method since this method incorporated suggestions for concept development. Additional hypotheses were, that regardless of reading achievement level or the sex of the subject, vocabulary would be retained with all methods.

METHOD

Subjects

Subjects for the experimental study included all third (N = 113) and all fifth (N = 108) grade students from a total of eight classrooms in a midwestern semi-rural community school which serves approximately 1000 students in grades kindergarten through six. The students attending this school come from a wide range of socioeconomic backgrounds so the student body is quite heterogeneous. Intact classrooms, four at the third grade and four at the fifth grade, served as the experimental groups, but the experimental unit of interest, the dependent variable, was each subject's scores on the evaluation tasks that were given at the end of each week of the study.

For analysis purposes only, the subjects were grouped as good and

poor readers and as boy or girl. Reading achievement scores from the previous October (1976) administration of the Iowa Test of Basic Skills were obtained for each subject from the school files in order to group the students as good or poor reading achievers. These two groups were determined by a median split of these standardized test scores.

Of the 113 third graders, and of the 108 fifth graders initially involved in the study, there were 93 complete sets of data for the third grade and 78 complete sets for the fifth grade at the end of the eight week study due to absences within that time period. For the third grade complete sets of data for 46 good and 46 poor readers were analyzed (one set of data was randomly omitted to insure equal group size), and complete sets of data for 43 girls and 43 boys were analyzed (7 sets of data for girls were randomly omitted to insure equal groups sizes). For the fifth grade complete sets of data for 39 good and 39 poor readers were analyzed, and complete sets of data for 36 boys and 36 girls were analyzed (6 data sets for boys were randomly dropped from the analysis to insure equal group sizes).

Sources of Experimental Content and Tests

In order to establish a set of words to be taught in the experiment, a checklist was devised which required that the subjects mark which of two sentences used an underlined word correctly. A third option of "neither" was available to alleviate the problem of guessing. The words underlined consisted of 150 words from The American Heritage Word Frequency Book

(Carroll, Davies, & Richman, 1971) and The Living Word Vocabulary: A National Vocabulary Inventory (Dale & O'Rourke, 1976). The investigator attempted to match the words in difficulty, while keeping the difficulty level high enough to insure that the best students would not know many of the meanings of the words. This was done by choosing words that 65-75% of eighth grade students know (Dale & O'Rourke, 1976). Once these words were chosen, those that were closely matched in SFI values (Carroll, Davies, & Richman, 1971) were used in the checklist. The investigator was careful to use words which were phonetically regular (easily 'sounded out' by use of phonic rules), and thus easily decodeable. The checklist also contained words that would be familiar to the subjects so they would be able to check words that were both known and unknown. The checklist was designed to be administered by the classroom teacher with specific instructions to read the sentences to the subjects so that the ability to read the words would not influence the responses. This checklist served as both a pre- and post-test measure. After the checklist was administered (pretest), the ninety-six words most often missed became the target words for the study. These ninety-six words were randomly assigned to eight sets of twelve words each to correspond to the eight weeks of the study. The same words were taught each week by each of four experimental methods. The materials for the four methods consisted of investigator-made worksheets designed to fit the tasks described as follows.

The association method (A) paired the unknown word with a familiar

synonym or brief definition. The task required that the subjects memorize the pairings in order to be able to rewrite the original pairs without referring back to the study sheet. For example, one day's study sheet contained the following four pairs:

barbarian ----------cruel, mean person

graphite ----------pencil-lead

colossal ----------large

wretched ----------unhappy

The category method (B) required that the subjects add to a list of words fitting a general category. Each list provided for the subject contained one target word and three familiar words. The subjects were to study the lists, add words from their own background to each list, and then to recategorize a random listing of all the previously provided words without referring to the study lists. An example of one day's study lists appeared as follows:

PART I

BAD PEOPLE	THINGS YOU CAN WRITE WITH
meal	pencil
cruel	graphite*
barbarian*	marker
robber	chalk

WORDS MEANING BIG	THE WAY YOU LOOK WHEN UNHAPPY
huge	wretched*
large	sad
giant	frowning
colossal*	miserable

*Note that the target words occur in each of the four possible positions. The target words were not starred in the actual experimental tasks.

PART II

cruel	chalk	see	pencil	miserable	sad
giant	angel	huge	colossal	bicker	mean
graphite	robber	large	barbarian	frowning	wretched
marker					

WORDS MEANING BIG THE WAY YOU LOOK WHEN UNHAPPY

BAD PEOPLE THINGS YOU CAN WRITE WITH

The context method (C) utilized the target words in meaningful sentences. This method required that the subjects read a three sentence passage where each sentence used the target word in a defining context. The context of the sentences were of a simple sentence structure and contained common words to make the context familiar. Each subject was asked to respond in writing to a question at the end of the passage with a word or phrase from his personal background experiences that further exemplified the target word. An example for one word appeared as follows:

> The barbarian kicked the dog and hit the owner in the nose. Any person who acts mean to anybody or to anything is a barbarian. Barbarian means a person who is very mean. Write down something that a barbarian might do at the dinner table.
>
> _____

The dictionary method (D) simply instructed the subjects to look up the designated target words in the dictionary, write their definitions, and write sentences containing each new word.

All the tasks developed were designed in such a way as to minimize the necessity for teacher involvement. Instructions and any of the words for each task were read to the subjects so that all subjects were able to attempt each task. The worksheets were given to, and collected from, the subjects by the classroom teacher in order to maintain the subject's natural educational environment.

Evaluation tasks were given at the end of each week of the study. These tasks were investigator-made cloze tests in which students filled in blanks with words taught during the previous week.

Procedure

To determine the effects of the experimental methods, a repeated measures Latin square type design was used. In other words, it was arranged that all subjects received all methods but in different orders. As seen in Figure 1, the four treatments are represented as: Association (A), Category (B), Context (C), and Dictionary (D).

		Classrooms			
# of Words	Phases	1	2	3	4
12	Week 1	A	D	C	B
12	Week 2				
12	Week 3	B	C	A	D
12	Week 4				
12	Week 5	C	B	D	A
12	Week 6				
12	Week 7	D	A	B	C
12	Week 8				

Figure 1. Basic plan of the design illustrating the order of treatments and the number of words taught during each two-week phase of the study.

There are also four rows to the design; each row consisting of two-week periods, or phases. Phases correspond to the consecutive two-week

periods in which each method was administered to each subject; thus there were four phases. Four words were taught on Monday, four on Tuesday, and four on Wednesday for a total of twelve words. Friday was test day for the twelve words. A total of 24 words were taught upon completion of each phase for a total of 96 words for the study.

Methods were presented from 10:15 to 10:30 a.m. for third grade classrooms and from 11:15 to 11:30 a.m. for fifth grade classrooms. Classrooms randomly designated as classroom one received methods in the order ABCD; as classroom two in the order DCBA; as classroom three in the order CADB; and as classroom four in the order BDAC. The twelve words for each week were taught on Monday, Tuesday, and Wednesday, and the evaluation test was given on Friday. This procedure was followed for eight weeks extending from March 3 through May 9, 1977.

Subjects receiving the association method were given a worksheet with the following instructions:

> In the list of word pairs below, the word on the left means nearly the same thing as the word on the right. Memorize the list of word pairs. When you think you have memorized the list, use a blank sheet of paper and try to write the list again without looking at this paper. The pairs do not have to be in the same order, but try to spell the words the best you can. Fold the second sheet of paper in half, or turn it over, and try again. You may ask your teacher for help in saying any of the words.

Subjects receiving the category method were given two worksheets with the following instructions, respectively:

> Study the list of words. Try to write more words that are like the words already in the list, or words that you think of when you read the title of the list. Do not worry about the correct spelling of the words that you add. Read each list at least three times when you are finished.

and

> Put the words below in the right group. When you finish, each group should have four words. You will have three words left over at the top of the page.

Subjects receiving the context method were given a worksheet with the following instructions:

> Read the sentences and fill in the blanks. Don't worry about spelling the word or words correctly that you fill in.

Subjects receiving the dictionary method were given no worksheets but their teachers were given the following instructions:

> There are no handouts for the dictionary task. You will give your students the following directions. Remember that after 15 minutes you should stop the task. Put the four words for the day (listed below) on the board. Students will need a sheet of paper. They should put their name on it. Tell them: Look up these four words in the dictionary. Copy only the number 1 definition on your paper. After the definition is written, use the word in a sentence that you make up. The sentence should show that you know the meaning of the word.

The eight evaluation tests given after each week of the study were of the same format; that is, they consisted of twelve sentences each

containing one blank where one of the twelve words taught in the previous week could be used appropriately. Instructions given with the tests were as follows:

> Twelve of the [20] words listed are words you have studied this week. Using the words only once, fill in the blanks in the sentences. You will have some words left over. Your teacher may read the sentences to you.

During the week following the completion of the eight week study, the checklist administered prior to the study was again administered to serve as a post-test. As stated previously, the checklist was administered orally by the classroom teacher. The format of the checklist remained the same; that is, subjects had a choice of three options-- one of two sentences or neither as using the underlined word correctly. For example, item 9 appeared as follows:

9. _____a. The gooey bramble stuck to the roof of his mouth.
_____b. The bramble got caught on Mary's coat.
_____c. Neither.

RESULTS

The dependent variable of interest for this study was the total number of correct responses on each evaluation task given after each of the eight weeks of the study. Each evaluation task tested twelve words so a

score of 12 was the maximum for any one week. Total number of correct responses on the pre- and post-test administration of the vocabulary checklist were also compared. Comparisons for good and poor reading achievers and for girls and boys were also made.

Preliminary Analyses

Some preliminary analyses of the data were made prior to testing the specific hypotheses of the study. These analyses were made to: 1) discover if the length of time of the study (8 weeks) might have had an affect on the performance of the subjects, and 2) obtain more revealing information about the data itself by examining the means for each of the eight weekly test scores. For the first of these preliminary analyses a simple linear regression analysis on student score versus time periods 1 through 8 was used. The results of the regression analysis were significant ($F_3(1,742) = 11.52$, $p < .001$; $F_5(1,622) = 6.71$, $p < .01$). The corresponding correlation coefficients were $r_3 = -.12363$ and $r_5 = -.10329$. These results indicate that there was a slight downward trend in the scores over the eight-week period.

For the second analysis involving the eight weekly means (see Table 1), the means were first plotted. Figure 2 shows the result of this plotting, and reveals a distinct rising and falling pattern between grades three and five. In order to obtain a measure indicating the strength of the relationship indicated in this graph, a Pearson product-moment correlation

Table 1

Weekly mean scores on evaluation tasks

Week	Third Grade (N = 93)	Fifth Grade (N = 78)
1	4.87	7.37
2	3.22	5.79
3	3.89	6.68
4	3.10	5.74
5	3.80	5.40
6	3.62	6.03
7	2.52	4.97
8	3.32	6.22
	GRAND MEAN = 3.54	GRAND MEAN = 6.03

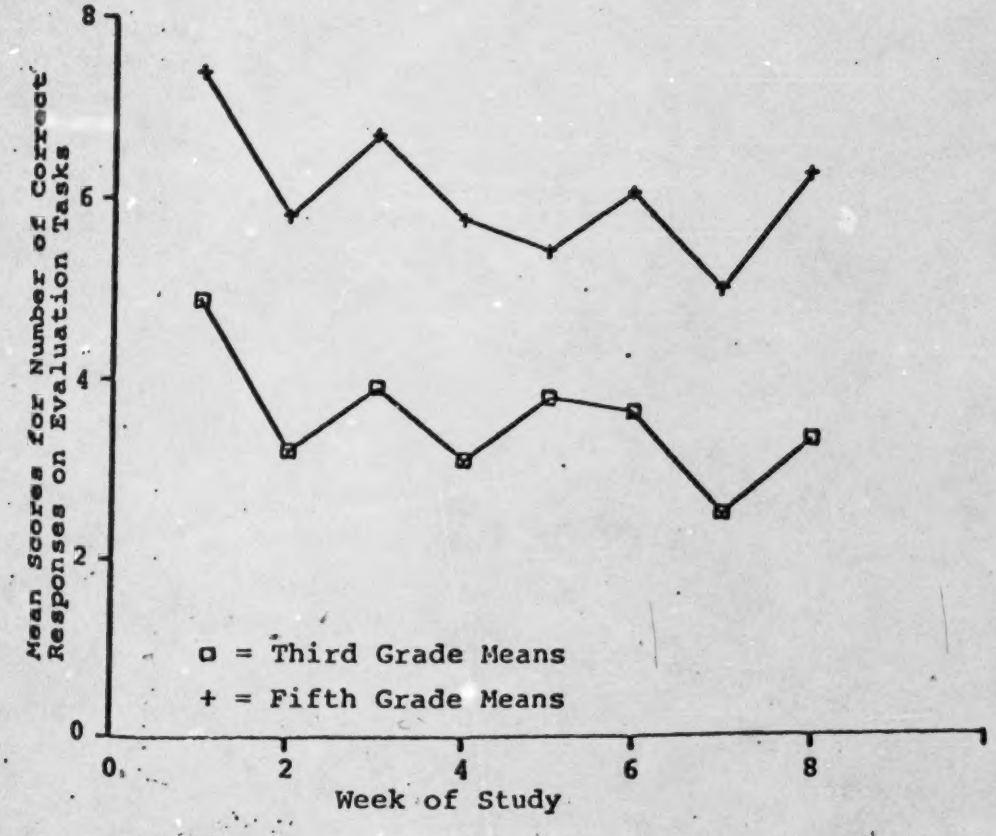

Figure 2. Weekly mean scores for third and fifth grades.

coefficient was calculated. The actual correlation coefficient was r = .853 and it was found to be significantly different from zero ($t(6)$ = 4.003, $p < .01$).

These results were interpreted to mean that: 1) there was a decline in scores over the eight week period, and 2) confounded with the time effect was a word difficulty effect since this is the only other factor having identical components over the eight-week period. In other words, it was only time and the same words being taught that the eight weeks had in common. Therefore, one could read Figure 2 to mean Weeks' 1, 3, 6, and 8 words are easier than the words for Weeks 2, 4, and 7 in this study. In summary, it would seem that the tasks were appropriate, developmentally, for both grade levels. It is the level of word difficulty that must be modified as all of the weekly mean scores were lower for third graders.

Experimental Hypotheses

The analysis used to test the first hypothesis of no difference for methods was a single-factor, repeated measures analysis of variance on the dependent variable of interest. The analysis of variance indicated a strong method effect for both third, $F(3,276) = 20.98$, $p < .001$, and fifth, $F(3,231) = 31.99$, $p < .001$ grades. The experimental data reject the hypothesis of no difference for methods. Thus, the methods are affecting the performance of the students differently. It is not known at this point, however, which method is having the strongest effect.

It should be noted at this point that due to the time effect and variation in word difficulty revealed in the preliminary analyses, the data could be adjusted, or standardized, to eliminate the effects of these factors. In this study the data was adjusted by dividing each score of Week 1 by the mean score of Week 1, each score of Week 2 by the mean score of Week 2, and so forth. Then the analysis of variance was completed as it was for the unadjusted data. Due to the significant results of the analysis for hypothesis one using the unadjusted data, this procedure of adjusting the data is only discussed for the sake of example. By eliminating the effects of time and word difficulty one would expect the resulting F values for adjusted data to become higher. Indeed this was the case for both third, $F(3,276) = 24.99$, $p < .001$ and fifth, $F(3,231) = 36.27$, $p < .001$ grades. Adjusting the data would be most important in the event that the results of the analyses for unadjusted data were insignificant. However, due to the fact that significant results were obtained, results reported in this paper will be for unadjusted data only and thus the F values reported are probably somewhat conservative.

It had been anticipated prior to the experiment that the context method would have a more beneficial effect than all the other methods. Therefore, planned comparisons were used to test if the context method was significantly better than the others. The results of the planned comparison tests indicated the context method was significantly better than the other three

methods for both third, $F(1,276) = 55.75$, $p < .001$ and fifth, $F(1,231) = 83.57$, $p < .001$ grades.

It then became desirable to know more about the differences in the means for each method and the Newman-Keuls Range Test was applied to the data. Results of the Newman-Keuls analyses revealed that the context method was significantly better ($p < .01$) than all other methods for both grade levels. For third grade the association method was significantly better ($p < .05$) than the dictionary method, but not the category method. Also, the category method was not significantly different from the dictionary method.

For fifth grade the association method was significantly better than the category ($p < .01$) and the dictionary ($p < .01$) methods. Again, the dictionary and category methods did not differ significantly.

To test whether there were differences in performance for good and poor readers and for girls and boys, the appropriate data were analyzed using a two-factor analysis of variance with repeated measures on one factor. The repeated measures variable was method, which had four fixed levels. In the first analysis achievement was the second variable having two fixed levels. In the second analysis sex of the subject was the second variable having two fixed levels. The analysis of variance indicated a strong achievement effect for both third ($F(1,90) = 55.54$, $p < .001$) and fifth ($F(1,76) = 34.01$, $p < .001$) grades. The analysis of variance indicated no main effect for sex of subject in either third or fifth grade. The corresponding means for these data appear in Tables 2, 3, 4, and 5.

Table 2

Method means for good and poor readers in third grade

Method	Good Readers	Poor Readers
Association	5.12	1.90
Category	4.60	1.86
Context	6.36	2.51
Dictionary	4.57	1.41
Grand Means =	5.16 (N=46)	1.92 (N=46)

Table 3

Method means for good and poor readers in fifth grade

Method	Good Readers	Poor Readers
Association	8.03	4.10
Category	6.88	3.74
Context	9.23	5.46
Dictionary	7.13	3.63
Grand Means =	7.82 (N=39)	4.23 (N=39)

Table 4

Method means for third grade girls and boys

Method	Girls	Boys
Association	4.14	3.02
Category	3.71	2.77
Context	5.30	3.88
Dictionary	3.50	2.55
Grand means =	4.16 (N=43)	3.06 (N=43)

Table 5

Method means for fifth grade girls and boys

Method	Girls	Boys
Association	6.18	5.72
Category	5.07	5.21
Context	7.47	6.97
Dictionary	5.54	4.74
Grand means =	6.07 (N=36)	5.66 (N=36)

In both the two-factor analyses of variance the strong method effect was evident. When achievement level was the second factor, the method effect was significant for both grades ($F_3(1,90)^* = 20.48$, $p < .001$; $F_5(1,76)^* = 32.00$, $p < .001$). The interaction of method and achievement was not significant for either grade. When sex of subject was the second factor the strong effect for method is seen again ($F_3(1,84)^* = 22.22$, $p < .001$; $F_5(1,70)^* = 32.57$, $p < .001$). The interaction of sex of subject and method is not significant for either grade.

Additional Findings

In addition to the testing of the experimental hypotheses, information was desired on the overall improvement of the vocabulary taught. The data collected from the administration of the pre- and post- vocabulary checklist were used to obtain this information. Paired-difference t-tests were used to test for differences between pre- and post- test scores because the data resulted from paired dependent observations. A one-tailed t-test was used because one is only interested in rejecting H_0 when $\bar{d}$ is large and positive. In other words, there is no reason to expect a large negative $\bar{d}$. The results of these tests, Table 6, indicated that for both third and fifth grades, there was significant overall improvement for the vocabulary words taught.

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* It should be noted that the degrees of freedom used for this F test are not the usual degrees of freedom. Since method is a repeated measure and no tests were made to insure that the assumption of homogeneity of variance was met, the Greenhouse-Geisser Conservative Test was used. Under this conservative test procedure the degrees of freedom are, in general $F_{1-\alpha}[(p-1), p(n-1)]$ instead of $F_{1-\alpha}[(p-1)(q-1), p(n-1)(q-1)]$.

Table 6

Results of paired-difference *t*-tests

Grade	Vocabulary Means Pre-	Post-	*t*-value	*p* value
3(N=93)	81.45	99.00	8.94	< .001
5(N=78)	107.71	118.47	7.03	< .001

In summary, there was a significant difference between methods with the context method being the most effective. The context method was the most effective for both good and poor readers; however, good readers performed significantly better ($p < .001$) than the poor readers. There was no significant difference in performance on methods for boys and girls.

The context method was consistently the most effective method in every analysis made. Figure 3 illustrates the degree of this consistency. Even for the poor third grade readers, the context method was effective.

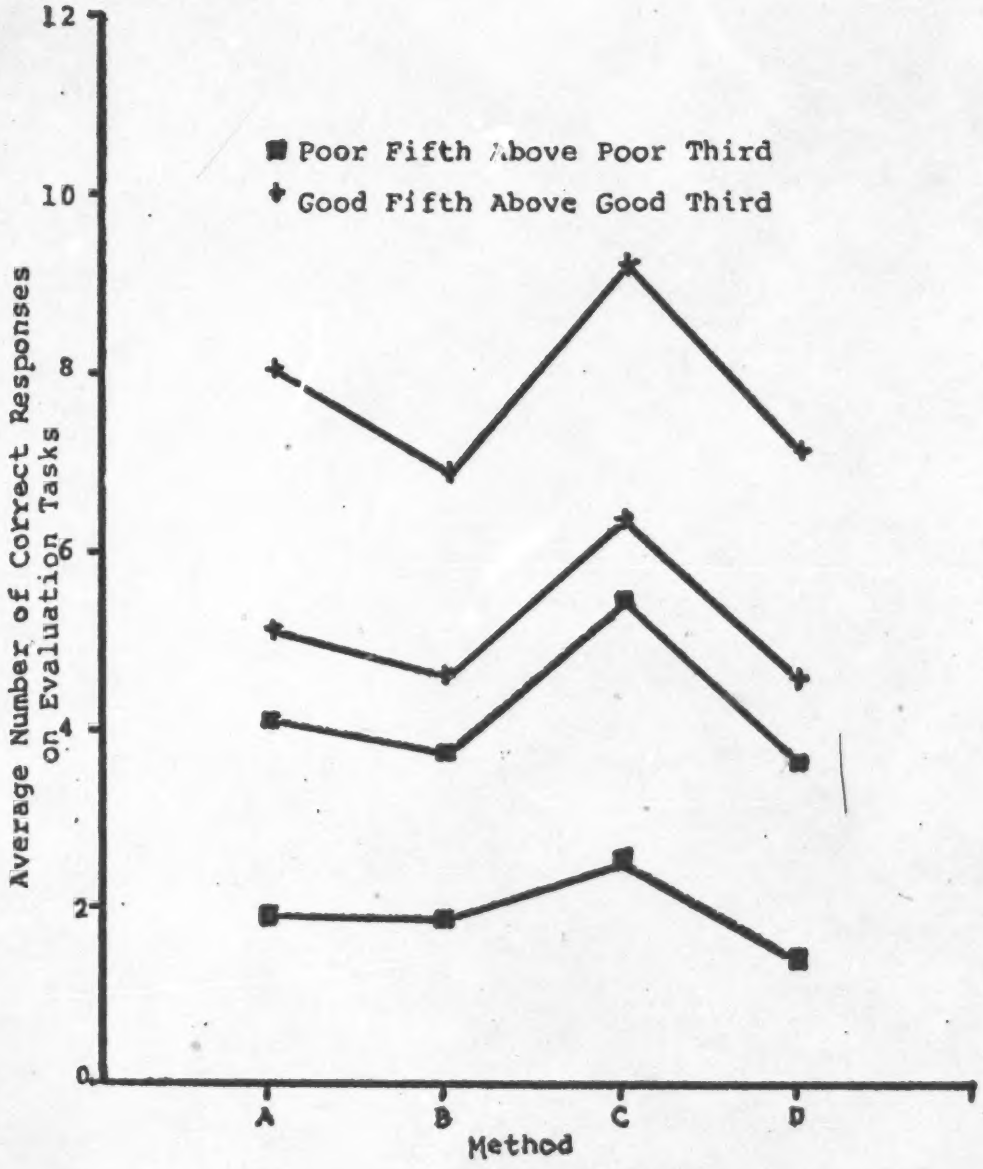

Figure 3 Method means for good and poor readers for third and fifth grades.

The patterns for all methods across achievement level, sex of subject, and grade level are consistently the same; that is, the context method is clearly the most effective for all subjects. The effectiveness of the association method is strongest with the good fifth grade readers, while it seems to have equal effectiveness for good third and poor fifth grade readers, and little effectiveness for poor third grade readers. So although the association method was found by the Newman-Keuls Range Test to be the second most effective method, it does not show the overall effectiveness of the context method.

DISCUSSION

While the stated purpose of this study was to compare four methods of teaching word meanings to find the most effective method, an underlying purpose was to interpret the results in terms of theories of cognitive processes, specifically theories for semantic memory. The two theories found to be the most amenable to examine in terms of how they might facilitate the learning of word meanings were the Collins and Quillian (1969, 1970) hierarchical model for semantic memory, and the Rumelhart, Lindsay, and Norman (1972) process model of long-term memory. For purposes of discussion and interpretation, the Collins and Quillian model will be described as additive. In other words, new information is 'added' to old information by associating the new word with a category, and properties common to all objects in that category. The new information is 'fit into' old information wherever it is

appropriate. In the Rumelhart, Lindsay, and Norman process model, which will be described as 'interactive', new information and the whole semantic memory system can change or reorganize accordingly.

The superiority of the context method would support the interactive model. The familiar context guided each learner to the 'old information' present in his conceptual base The target word could then be assimilated into the system on the basis of individual background experiences. The learner was not only provided with a definition of the target word but with the context in which the words appear. In this way the concept of the target word was learned so the meaning of the target word was retained (Bruland, 1974).

This same reasoning is reflected in the success of the association method. Words were taught by pairing the target word with a familiar word. In this way, the learner was able to utilize old information to aid in storage of the new information. The problem with the target word being forgotten in short-term memory (Melton, 1963) was eliminated by having the subjects memorize the list. The memorization process would require active rehearsal. This rehearsal would maintain the new information in short-term memory long enough for the new information to become permanently represented in long-term memory.

The poor results for the category method imply that a hierarchical model such as the Collins and Quillian model is not sufficient for explaining a method of teaching new words. In the Collins and Quillian model one cannot

arrive at any other point through a reasoning process as in the interconnecting system of Rumelhart, Lindsay, and Norman. Therefore, before the category method could effectively teach the meaning of the words the learner would already have to have the investigator-designated category established for similar words before the Collins and Quillian model could be useful.

Further explanation for the differences in results for context and association methods and for the category method might become clearer in terms of a recall versus recognition distinction as discussed by Kintsch (1968). Kintsch (1968) demonstrated how organization of a categorical nature facilitated recall but not recognition. In other words, recall was synonymous with retrieval, and recognition meant storage of the word's meaning had occurred. The difference between methods could then be explained by stating that the context and association methods facilitate storage of information, whereas the category method is perhaps only facilitative of recall. However, for the teaching of word meanings one is interested in the storage of information and not simply in the recall of information. This explanation is partially supported by Halperin (1974) who found that category cues facilitated the recall of lists for 6, 9, and 12 year olds. The meanings of the words were not a factor of interest in this study.

Because of the consistent results for each method it would appear that third grade students are as capable as fifth graders of using old information already available in their cognitive structures to learn new information if

allowed to draw from their personal experiences. Even the poor third grade readers could benefit from such vocabulary instruction if the words to be learned are presented in a familiar context and some response from them is required. Reid (1976) points out that a teacher behavior identified as critical for the success of the low-ability child is the ability to elicit responses from him. It follows that any instructional procedure that would accomplish this elicitation of a response would also be desirable and beneficial.

In summary, the conclusions that can be made from this study are:

1. Considerable support is provided by the results of this study that instruction in teaching word meanings helps elementary school children learn new word meanings.

2. The results of this study indicate that strong support exists for teaching word meanings to elementary school children by defining and providing examples of the usage of the new word in the context of familiar events.

3. The results of this study provide support for teaching word meanings to elementary school children by requiring that they associate, through memorization, the new word with a familiar synonym or definition.

4. The organization of new words into instructor-designated categories for the purpose of teaching the meanings of those words is not strongly supported.

5. Using dictionary practice to teach the meanings of new words is not strongly supported.

6. Differences in performance for good and poor readers do exist but only with respect to the number of correct responses; that is, both good and poor readers learn word meanings best with a context method. However, the good readers learn more words than the poor readers.

7. Significant differences in performance for boys and girls did not exist, but mean scores for girls were slightly higher than mean scores for boys.

8. Based on the results of this study, it can be stated that third grade children appear to be as developmentally capable in terms of cognitive development as fifth grade children to utilize what they already know to learn something new. In terms of this study, even the poor third grade readers could utilize the context in which a word is found to learn the meaning of that word provided the context is a familiar one.

9. Results of the study indicate that an interactive model for cognitive processes such as the Rumelhart, Lindsay, and Norman process model for long-term memory, may provide useful information for studies investigating methods for increasing word knowledge.

Educational Implications

The implications for educators as indicated by the present study are consistent with many classroom practices currently in use. Methods for teaching new word meanings should introduce the new word in an appropriate contextual setting. An attempt should be made to insure that this contextual setting is familiar. The present trend to view the reading process as a

cognitive task should be explored further and practically applied.

In general, educators would agree that "words have meaning to a child only when they are related to things he has experienced or knows about" (Harris & Sipay, 1975, p. 440). It follows that instruction should make use of what the child already knows to teach new meanings of words. If the child is introduced to a new word without being given any indication as to how and when this new word should be used, there is nothing available to him that will 'trigger' the interactive process of the cognitive structure for assimilation of new information. In many instances use of the dictionary is not helpful for the initial learning of word meanings because the definitions and example sentences are such that unless the user has some prior knowledge as to the word's meaning there is nothing available in the definition to 'trigger' the interactive process.

Presently used methods of introducing new vocabulary such as using the new word in a sentence designed to explain its meaning, or the use of a familiar synonym are supported by the results of this study. The teacher employing these kinds of methods should also try to assure that the words used in explaining the new word are familiar, and that any synonyms used are also understood. In addition, especially in light of the present study, the learner should be required to respond in a written manner to demonstrate understanding of the new word. It is probably not sufficient for the teacher to assume that because the new word has been introduced in a familiar context that the

child now understands the word. This study would suggest the word be introduced not only in a sentence, but in several sentences, one of which is defining. Once these sentences have been studied, the learner should be asked to apply the new word's meaning to his own experiences, as the tasks used in this study demonstrated. Written exercises should be provided which demand that the learner think about and use the word's meaning. Further practice with the new words can occur in many ways: filling in blanks in sentences, matching words with synonyms, using the dictionary to find synonyms or antonyms, and grouping words of similar meaning together to name a few. In choosing words to teach it should be remembered that if a word is important enough to know, it is important enough to teach well.

Theoreticians and researchers need to examine further the nature of tasks designed to teach reading skills and the theoretical basis for these tasks. It has been recognized that reading involves language processes, cognitive processes, and memory processes. Instructional procedures should be evaluated in terms of their relationships to each of these processes.

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